RESEARCH BULLETIN 991 JANUARY 1967

# Farmers' Responses to the Feed Grain Program in the Ohio Corn Belt Area

J. ROBERT TOMPKIN
F. J. RAFELD
D. E. KIMMET

**OHIO AGRICULTURAL RESEARCH AND DEVELOPMENT CENTER**
**Wooster, Ohio**

IN COOPERATION WITH

FARM PRODUCTION ECONOMICS DIVISION
ECONOMIC RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE

# CONTENTS

* * * *




## ACKNOWLEDGMENTS

The authors express appreciation to the many farmers in western Ohio who cooperated in furnishing information and to the Ohio ASCS office and the county ASCS office managers and their staffs for their assistance in drawing the sample. Several members of the Farm Production Economics Division, USDA, made valuable comments, particularly James Vermeer, whose comments and suggestions were of substantial value. Several members of the Department of Agricultural Economics and Rural Sociology, Ohio Agricultural Research and Development Center and The Ohio State University, made helpful suggestions which improved the report.




AGDEX 871/110 1-67-3M

# Farmers' Responses to the Feed Grain Program in the Ohio Corn Belt Area

J. Robert Tompkin,[1] F. J. Rafeld,[1] and D. E. Kimmet[2]

## INTRODUCTION

### The Problem

Farm output has more than doubled since 1910. This growth in output outpaced the growth in demand, particularly during the 1950's. The result was a substantial increase in stocks of feed grains, most of which were held by the Commodity Credit Corporation. These stocks not only required a large public outlay for storage but constituted a large visible supply of farm products with possible adverse effects on farm product prices.

Several agricultural programs have been initiated to help solve this problem. One is the feed grain program which was introduced in 1961 and is to be continued, with some modifications, through 1969. The stated objectives of the program are to: 1) reduce the burdensome stocks of feed grains; 2) reduce government costs; 3) strengthen farm income; and 4) assure adequate supplies at fair and equitable prices. The program was designed to achieve the above objectives by bringing production into line with demand.

### Midwest Feed Grain Study

The Economic Research Service, USDA, in cooperation with eight Corn Belt states, initiated a regional project to study the effects of the 1962 Feed Grain Program on Corn Belt farms. Under the leadership of James Vermeer, Economic Research Service, USDA, sample farms were drawn in Iowa, Illinois, Indiana, western Ohio, and parts of South Dakota, Nebraska, Missouri, and Minnesota. The data were collected in early 1963. A preliminary report and a more comprehensive analysis have been prepared by the Economic Research Service.

## OHIO PARTICIPATION IN THE REGIONAL STUDY

Thirty-four counties in western Ohio, constituting the eastern tip of the Corn Belt, were included in the overall study. The Ohio sample contained 69 participating farmers and 94 farmers who were not participating in the 1962 Feed Grain Program.

In 1962, 37 percent of eligible Ohio farmers participated in the feed grain program. They represented 57,570 farms diverting a total of 868,600 acres or an average of 15.1 acres for each farm in the program. Ohio farmers harvested 4 percent more corn acreage in 1962 than in 1961 but 21 percent below the 1960 acreage. Actual corn production in Ohio in 1962 was 202.4 million bushels, which is 8 percent above 1961. Yields, however, averaged 75 bushels per acre in 1962 compared with 73 bushels in 1961 and 67 bushels in 1960.

Since the 1962 Feed Grain Program data for Western Ohio had been collected in the regional study and were available, it was decided to use this information in conjunction with the 1961 Ohio feed grain investigations[3] to study western Ohio farmers' reactions to this type of farm program. Modifications were made in the programs almost every year between 1961 and 1965 but the objectives and the basic provisions of the annual programs were the same.

It was believed that a study of 1961 and 1962 would provide an excellent indication of farmers' responses to the general feed grain idea in terms of:

1. Characteristics in which participating and nonparticipating farms differed.
2. The extent of adjustments in organization made by participating farmers.
3. The effect of participation on returns to the operators.
4. Farmers' reactions to suggested program modifications designed to increase participation or to lower the cost of the program.

### The Ohio Sample

Nine counties were drawn at random from the 34-county Corn Belt area of Ohio (Figure 1). A three-stage random sample of farms was selected. The counties, townships, and farms were selected randomly and in proportion to the number of farms in these areas. This procedure assured each county, each township, and each farm an equal chance of being drawn.

The sample consisted of 163 farms, plus replacements, and was drawn from lists of corn-producing farms compiled from the county ASCS office records.

---

[1] Agricultural Economists, Farm Production Economics Division, Economic Research Service, U.S. Department of Agriculture.

[2] Research Assistant, Department of Agricultural Economics and Rural Sociology, Ohio Agricultural Research and Development Center.

[3] Sharples, J. A. and J. R. Tompkin. 1963. The Effect of the 1961 Grain Program on West-Central Ohio Farms. Ohio Agri. Exp. Sta. Res. Bull. 947.

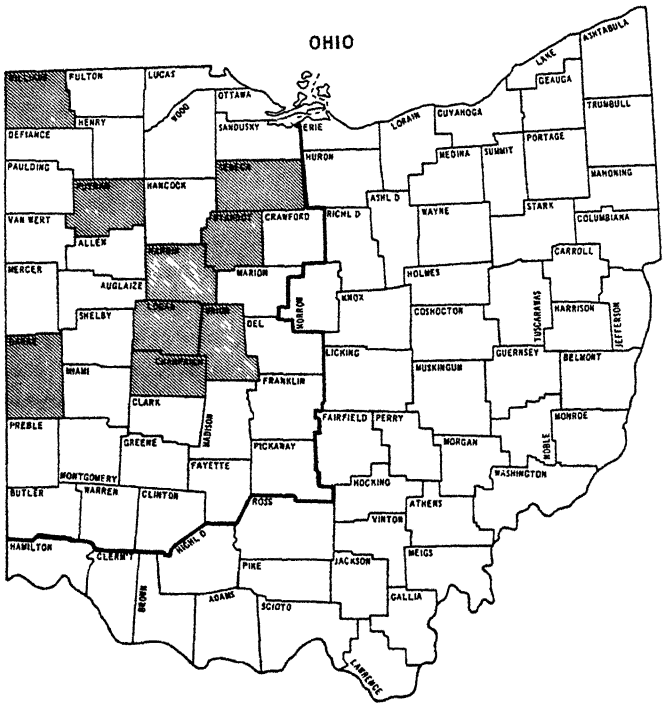


**Fig. 1.–Project area with nine randomly drawn county sampling units.**

This sample included 69 operators who were participating in the 1962 Feed Grain Program and 94[4] who were not. The farms were visited and the operators were interviewed during January, February, and March, 1963. The counties drawn, together with the number of townships per county and the number of farms per county, are shown in Table 1.

Data regarding base acreage, productivity index ratings, diverted acreages, diverted acreage payments, ACP payments for cover crops, and the number of tracts operated by each farmer were obtained from the records in the ASCS offices in each county.

The sample was designed to represent a population of farms having feed grain bases in 1962. The sample represents almost 1 percent (0.93 percent) of the land area in the nine counties. The State Agricultural Stabilization Committee statistics listed participation in the nine-county areas at 38 percent of the farms growing corn and the sample showed 42 percent of the farms in the sample participating. This difference is not statistically significant.

The ASCS records revealed that 21 percent of the total base acreage in the nine-county sample area was actually diverted and the sample showed 23 percent of the total base acreage being diverted by the operators. This difference is not statistically significant, thus indicating the sample to be representative of the population in this respect.

The productivity index assigned to each farm by the county ASCS committee was based on an average county productivity index of 100. When the weighted productivity indexes of the farms in the sample were checked, they averaged 99.9.

### Description of the Ohio Sample Area

The sample counties lie in the western half of Ohio. The topography of the area varies from nearly flat to gently rolling, with predominating soils being Blount, Pewamo, Nappanee, Crosby, and Brookston. Rainfall averages 36 to 40 inches annually in western Ohio.

Dairy, hog, general livestock, and cash grain farming are the most prevalent farm types. Fifty-four percent of the 1962 farm income in the nine counties was from the sale of livestock, 40 percent from the sale of crops, and 6 percent from government payments[5] to farmers.

[4]Eight of the nonparticipating farms contained incomplete data. Some analyses in this report are based on 86 farms and some on the total 94 farms.

**TABLE 1.–Counties Included in the Sample.**

| Counties Drawn | Number of Townships Drawn | Number of Farms Drawn |
|---|---|---|
| Champaign | 2 | 14 |
| Darke | 5 | 31 |
| Hardin | 3 | 16 |
| Logan | 2 | 14 |
| Putnam | 4 | 22 |
| Seneca | 4 | 21 |
| Union | 2 | 15 |
| Williams | 3 | 17 |
| Wyandot | 2 | 13 |
| Total | 27 | 163 |

## THE 1962 FEED GRAIN PROGRAM

The 1962 Feed Grain Program was a voluntary program of corn, sorghum, or barley acreage reduction from an acreage base established from each farm's 1959 and 1960 acreage. Since the sorghum and barley acreage raised in Ohio is small, this report deals only with the diversion of corn acreage.

The operator could contract to divert a minimum of 20 percent of his corn base acreage. The maximum amount of permitted diversion depended on the size of the base acreage. Farmers with a base acreage of 25 acres or less could divert their total base acreage. Farmers with a base between 25 and 100 acres were eligible to divert a maximum of 20 acres plus 20

[5]Government payments during 1962 included: sugar beet payments, agricultural conservation practices, conservation reserve, wool payments, feed grain and wheat programs.

percent of their base acreage. Farmers with bases exceeding 100 acres were limited to a maximum of 40 percent of their base acreage.

The payment rate per acre for the first 20 percent diverted was 50 percent of the normal yield times the county support price (average of $1.25 in Ohio). The second 20 percent diverted was paid at the rate of 60 percent of the normal production times the county support price. For diverted acreage exceeding 40 percent of the base, the rate was the same as for the first 20 percent diverted. The operator was not permitted to remove a crop or to graze diverted acreage between May 1 and November 1, 1962.

Participation in the program also made farmers eligible for program benefits based on the normal production of their 1962 corn acreage. Thus, if the farmer chose to participate, he could plant the undiverted base acreage to corn, maintain his conserving acreage (also based on 1959-60 averages), receive payment for diverted base acreage, and be eligible for price support loans on the normal corn production of that acreage planted for harvest.

## FACTORS ASSOCIATED WITH PARTICIPATION IN THE FEED GRAIN PROGRAM IN OHIO

The analyses in this section deal primarily with differences between the groups of participants and nonparticipants in the sample. Comparisons made in this section include: (1) land resources, (2) farm organization, (3) off-farm employment, (4) farm operators and (5) tenure. All differences were tested for statistical significance at the 0.05 probability level.

### Land Resources

Participant farms averaged 25 acres larger than nonparticipating farms, with the mean sizes being 159 and 134 acres, respectively. The average size of all farms was 145 acres. The distribution of sample farms according to size categories is shown in Table 2.

Participating owner-operator farms averaged 125 acres compared with 84 acres for nonparticipating owner-operators. This difference was statistically significant at the 0.05 level of probability.

Participants' mean cropland acreage of 128 exceeded that of the nonparticipants by 22 acres, averaging 16 acres more on rented land and 36 acres more on owned farms.

The corn acreage base gave an indication of the number of acres of corn ordinarily grown on the farms before the program. The study indicated that most farmers planted from 20 to 40 percent of their total cropland to corn. On both participating and nonparticipating farms, the base acreage on share-rented cropland constituted a greater percentage of cropland acreage than was true on owned and cash rented cropland. This could be expected, however, as rented cropland is usually cropped more intensively than comparable owned cropland.

It was assumed that any difference between the normal yields assigned to participant and nonparticipant farms was due to a difference in the land quality. Participants' average assigned normal yields were 4.5 bushels higher and actual yields in 1962 were 4.7 bushels higher than nonparticipating farms. These yield differences were not statistically significant, thus indicating the quality of land farmed by the two groups to be about the same

**TABLE 2.–Distribution of Sample Farms by Size.**

| Size of Farm in Acres | Participants | | Nonparticipants | | All Farms | |
|---|---|---|---|---|---|---|
| | Percent | Accumulated Percent | Percent | Accumulated Percent | Percent | Accumulated Percent |
| Under 10 | 0.0 | 0.0 | 5.3 | 5.3 | 3.1 | 3.1 |
| 10- 49 | 11.6 | 11.6 | 19.1 | 24.4 | 15.9 | 19.0 |
| 50- 69 | 11.6 | 23.2 | 7.5 | 31.9 | 9.2 | 28.2 |
| 70- 99 | 18.8 | 42.0 | 15.9 | 47.8 | 17.2 | 45.4 |
| 100- 139 | 7.2 | 49.2 | 12.8 | 60.6 | 10.4 | 55.8 |
| 140- 179 | 17.4 | 66.6 | 12.8 | 73.4 | 14.7 | 70.5 |
| 180- 219 | 8.7 | 75.3 | 8.5 | 81.9 | 8.6 | 79.1 |
| 220- 259 | 5.8 | 81.1 | 10.6 | 92.6 | 8.6 | 87.7 |
| 260- 499 | 17.4 | 98.5 | 7.5 | 100.0 | 11.7 | 99.4 |
| 500- 999 | 1.5 | 100.0 | 0.0 | 100.0 | 0.6 | 100.0 |
| Average size farm (acres) | 159.0 | | 133.5 | | 145.1 | |

Actual yields correlated significantly with assigned normal yields for both participating and nonparticipating groups of farmers. This strongly implies that county committees did a satisfactory unbiased job of assigning normal yields to the farms.

Participant farmers placed a higher percentage of their cropland acreage in soybeans, wheat and diverted acres in 1962 than nonparticipants and a lower percentage of their cropland acres in corn, oats, hay, and rotational pasture. Both groups had about 2 percent idle cropland on their farms.

Sharples and Tompkin found that during the 2-year period before the program went into effect, participating farmers averaged about 10 percent more cropland in corn and soybeans than nonparticipating operators.[6] The present study shows that in 1962 participants averaged 6 percent less cropland in row crops than farmers not in the program. This reduction of some 16 percent in cropping intensity was consistent with the objective of resting cropland.

### Farm Organization

Forty-four percent of the participant farms and 63 percent of the nonparticipant farms were classified as livestock farms. A chi-square test showed this difference to be statistically significant at the 0.01 probability level.

Farmers with dairy herds were less likely to reduce normal corn acreage as required for participation in the program. Ten of the 69 participating farms had commercial dairy herds of eight cows or more and 23 of 86 nonparticipants had commercial dairy herds. Thus, if dairy farms are representative of all livestock farms, the evidence indicates that livestock farmers preferred to stay out of the feed grain program and that most of the cash-grain operators would rather be in the program. This is to be expected, since corn fed to livestock does not draw the support price as does corn stored under CCC loan.

### Off-Farm Employment

Operators working 20 weeks (100 days) or more at off-farm jobs were designated as part-time farmers. Participant and nonparticipant part-time farmers averaged total acreages of 103 and 74 acres, respectively, and base acreages of 32 and 19 acres. Twelve of the 25 part-time participants diverted their entire base acreage, thus eliminating labor requirements for the corn enterprise except for maintenance on the diverted cropland. Four of the 29 part-time nonparticipants raised no corn in 1962.

### Farm Operators

It was believed that farmers over 60 years of age would be more likely to participate in the program to reduce labor requirements and risk and still be assured of an income from their land. Twenty-three of the 69 participating operators were 60 years of age or older. Of the 86 nonparticipants who answered the question on age, 15 were 60 or older. A chi-square test showed these proportions to be significantly different at the 0.05 level. It was concluded, therefore, that the feed grain program in Ohio had special appeal to the older operators.

The average ages of feed grain program participants and nonparticipants were 51 and 47 years of age, respectively.

### Farm Tenure

Of the 163 farmers interviewed, 103 were owner-operators[7] and 44 of these were in the feed grain program in 1962. These 44 owner participants had farms averaging 125 acres in size compared with 84 acres for nonparticipant owners. This size difference is statistically significant at the 0.05 level. However, the difference in the proportion of owners participating and not participating is not significant at the 0.05

[6] *Op cit.*

[7] An owner-operator is a farmer who owns all the land he farms.

**TABLE 3.–Distribution of Off-farm Employment, 1962.**

| Item | Participants | | Nonparticipants | |
|---|---|---|---|---|
| | Number | Percent of Total Participants | Number | Percent of Total Nonparticipants |
| Working full-time jobs off farm (48 weeks or more) | 20 | 29.0 | 21 | 22.3 |
| Working 20-47 weeks off farm | 5 | 7.2 | 8 | 8.5 |
| Working 1-20 weeks off farm | 4 | 5.8 | 1 | 1.0 |
| Full-time farmers | 39 | 56.6 | 56 | 59.7 |
| Number not reporting | 1 | 1.4 | 8 | 8.5 |
| Total | 69 | 100 | 94 | 100 |

level. Part-owners[8] and tenants showed no significant difference in the proportion of operators participating or not participating (Table 4).

[8]A part-owner is an operator who owns part of the land he farms and rents from someone else.

**TABLE 4.–Distribution and Size of Participating and Nonparticipating Farms, by Tenure.**

| | | | Participants | | Nonparticipants | |
|---|---|---|---|---|---|---|
| | Number | Percent | Number | Average Acreage | Number | Average Acreage |
| Full-owner* | 103 | 64 | 44 | 125 | 59 | 84 |
| Part-owner | 30 | 18 | 14 | 251 | 16 | 227 |
| Tenant† | 30 | 18 | 11 | 187 | 19 | 175 |
| All farms | 163 | 100 | 69 | 161 | 94 | 127 |

*Full-owner farms refer to farms on which the operator owns 100 percent of the land on his farm.
†Tenant farms refer to farms rented on crop share leases.

## HOW THE 1962 PROGRAM AFFECTED ORGANIZATION AND PRACTICES ON PARTICIPANT FARMS

Participation in the feed grain program presented a new situation in terms of management on participating farms. It called for adjustments and changes relative to (1) diverted cropland, (2) new or different practices due to participation, (3) fertilization, and (4) livestock.

### Diverted Cropland

A reduction in the amount of acres planted to corn obviously was the largest adjustment due to participation. Table 5 indicates the diversion pattern followed by the sample Ohio farmers.

**TABLE 5–Percentage of Base Acres Diverted by Participants, 1962.**

| Diversion Percentage | Number of Participants |
|---|---|
| 20.0-21.0 | 6 |
| 21.1-30.0 | 4 |
| 30.1-38.9 | 12 |
| 39.0-41.0 | 7 |
| 41.1-99.9 | 22 |
| 100.0 | 18 |
| Total | 69 |

Most farmers participating in the program preferred the maximum level of diversion. The tenure of the participants did not have much effect on the level of diversion. There was no significant difference in the amount of acreage diverted by the crop share renters and the owner-operators. In several cases it was evident that participants diverted between the minimum and maximum acreage because of rotational convenience.

### Practices Introduced on Diverted Acreage

Practices followed on diverted acres varied among farmers. Thirty-five of the 69 operators left their diverted acreage in previously established cover crops. This is a higher percentage than the 15 out of 75 found in the 1961 study. This is not surprising because 29 of these 35 farmers were feed grain program participants in 1961 and could have established their cover crop the previous year and diverted the same land in 1962. The only expense would be clipping the diverted acres twice during the season.

Fifteen of the farmers summer-fallowed their diverted acreage. This normally included plowing once and disking 3 or 4 times for weed control. Farmers following this practice usually planned to sow the diverted acres to wheat in the fall. Five farmers left their ground idle and sprayed the weeds or clipped the acreage. Fourteen farmers established a new cover crop on their diverted acreage, in most cases planting a mixture of perennial and annual forage crops.

### Fertilization Practices

In 1961 and 1962, participants fertilized an average of 32.4 acres and 33.1 acres of corn, respectively, or an increase of about 2 percent. In 1962, participants increased the amount of plant nutrients per corn acre about 12 percent over 1961 and nonparticipants increased about 8 percent over 1961 (Table 6). Part-owners generally used the same rates of fertilizer on owned and rented land at planting time but were more likely to apply additional nitrogen to only the owned land.

TABLE 6.–Adjustments in Corn Acreage and Fertilizer Used on Corn Land, Average Applied per Farm, 1961 and 1962.

| | Participants | | Nonparticipants | |
|---|---|---|---|---|
| Total Sample | 1961 | 1962 | 1961 | 1962 |
| Corn acreage per farm | 32.4 | 33.1 | 33.8 | 35.8 |
| Nutrients per acre corn | | | | |
| Lb. nitrogen | 35.5 | 40.3 | 34.0 | 41.5 |
| Lb. phosphorus | 47.6 | 52.5 | 45.0 | 44.7 |
| Lb. potash | 40.5 | 45.9 | 38.0 | 40.2 |
| Lb. of nutrients per corn acre | 123.6 | 138.7 | 117.0 | 126.4 |
| Cost per acre | $ 11.20 | $ 12.60 | $ 10.32 | $ 11.15 |

Two of the 54 participants who received advance payments reported that additional fertilizer use was made possible by receipt of the advanced funds.

### Feed Grain Utilization

Eighteen of the 69 participants did not raise corn on their farms in 1962. Forty-nine participants indicated that they fed or planned to feed part of their feed grain production. Fourteen operators fed their grain to within 100 bushels of their total production and 12 operators fed more than their production. These 12 operators, however, could have raised sufficient feed for their requirements by participating at a lower diversion level. They apparently felt that they were economically ahead to divert more acreage and buy additional feed.

### Livestock Adjustments

Some participants preferred to purchase additional feed rather than reduce livestock breeding herds because of the uncertainty about the renewal or extension of the 1-year program.

Adjustments did occur in the feeder pig enterprise. Twelve participants sold feeder pigs and only one bought feeder pigs as compared with seven and eight, respectively, for nonparticipants. This indicates that participants either thought it was more profitable to sell the feeder pigs rather than buy feed to finish them out or they decided to participate because they planned to sell feeder pigs.

## EFFECT OF FEED GRAIN PROGRAM PARTICIPATION ON RETURNS PER CORN BASE ACRE

About half (46) of the 94 nonparticipators said they stayed out of the program because they felt it would not be as profitable as raising more corn. The data collected from the cooperating farmers was not extensive enough to make profit comparisons between participation and nonparticipation when attendant organizational adjustments were involved. However, net returns above variable costs per corn base acre[9] were computed for the sample farms, considering various levels of acreage diversion, actual corn yield, normal corn yield, corn base acreage size, and the market price of corn.

### Assumptions

In arriving at per acre returns from participation, the following assumptions were made:

1. The operator owned sufficient machinery, equipment, and storage facilities to plant, cultivate, harvest, and store the corn which could be produced on the base acreage.

2. Costs per acre for producing corn were those shown in Table 7.

3. Costs per acre for diverted land included 55 cents for clipping weeds and 0.6 hour of labor.

4. Corn produced in 1962 which was sold and not eligible for price support averaged a net price of $0.885 per bushel.[10]

5. Corn eligible for support would sell at a net price of $1.133 per bushel.[11]

6. Because the spread between support price and market price was greater for the 1962 crop than in most other years, situations were assumed where the net market price was $0.985 and $1.085.

[9]Fixed costs were not included in the computations.

[10]Open market corn prices paid to farmers averaged $0.997 per bushel from November 1962 to March 1963. The net price received by farmers would be $0.885 after deducting $0.05 marketing costs, $0.012 tax, and $0.05 shelling expense.

[11]The gross loan price in 1962 was $1.25 per bushel for No. 2 corn. The net price received per bushel by the farmer was $1.133 after deducting $0.05 marketing costs, $0.005 purchase agreement, $0.012 tax, and $0.05 shelling cost. In the computations, on-farm storage was assumed so there would be no government storage charge.

7. Farmers will apply fertilizer at the rate which they feel will return the optimum yield. No changes were made in fertilization rate with varying yields or varying size of corn base acreage.

### Effect of Size of Corn Base Acreage on Returns

Analysis of returns per corn base acre indicated that as the size of corn base acreage increased, the returns per acre increased in about the same amount as the reduction in production cost per acre. This amounted to about $1 per acre for each increment of 80 acres increase in corn acreage. This cost reduction associated with increase in corn acreage should be noted in interpreting Figures 2, 3, and 4.

### Effect of Normal Yield-Actual Yield Relationships on Level of Diversion

When actual yield exceeds normal yield, the 20 percent diversion level of participation generally would return a greater net return above variable costs per corn base acre than any other level. For example, assuming that farmers would receive $0.885 per bushel of corn not eligible for price support loans and normal yields were 80 bushels per acre, diversion of 20 percent of the base would be more profitable when actual yields were 76 bushels or more; diversion of 40 percent of the base would be more profitable when actual yields were below 76 bushels (Figure 2). When actual yields were about 69 bushels and normal yields were 70 bushels, returns from 20 percent diversion and 40 percent diversion would be about equal. With normal yields at 60 bushels per acre, diversion of 20 percent of the base would be more profitable than any other level of diversion when actual yields were 62 bushels or more. Figure 2 shows that when normal yield is 70 bushels and actual yield is below 69 bushels, 40 percent diversion is more profitable than the 20 percent level. The difference in profitability increases as the actual yield declines. The reverse is true as the actual yield increases above the normal yield.

### Effect of Market Price of Corn on Returns

In 1962, the differential between net support price and net market price was about $0.248 ($1.133 –$0.885). This amount of spread made participation in the program more profitable than nonparticipation in most cases. If this amount of difference had been expected by most farmers during the signup period, the proportion of farmers participating undoubtedly would have been much higher.

In Figures 2, 3, and 4, lines showing the net returns from market prices of $0.885, $0.985, and $1.085, respectively, have been superimposed on the diversion rate and the normal yield lines. Figure 2 shows that when the net market price is $0.885, and the net support price is $1.133, participation in the program gave higher net return above variable costs per corn base acre at all reasonable combinations of actual and normal yields. A farmer would be better off to stay out of the program only if actual yields were above 101 bushels and normal yields were only 60 bushels. Similarly, with 70 bushels normal yield and about 113 bushels actual yield, participation would become less profitable.

As the net market price of corn increases relative to the net support price, nonparticipation becomes more profitable than participation at lower levels of normal corn yields and/or actual yields than at the $0.885 net corn price. Figures 2, 3, and 4 show the combinations of yields and diversion levels where returns from nonparticipation are above those from participation. The line on the figures which represents nonparticipation moves to the left in response to higher market price. Any yield and diversion combination falling below this line returns a smaller net variable profit per corn base acre from participation in the feed grain program.

To illustrate the use of Figures 2, 3, and 4, assume that farm A has a normal yield of 70 bushels per acre and realizes an actual yield of 95 bushels.

**TABLE 7.–Variable Costs of Producing an Acre of Corn on Different Size Farms in Northwestern Ohio.***

| Expense | Size of Farm in Crop Acres | | |
|---|---|---|---|
| | 100 | 200 | 400 |
| Labor (@ $1.25/hr.) | $ 8.00 | $ 7.38 | $ 6.00 |
| Tractor costs | 3.80 | 3.45 | 2.69 |
| Machinery costs | 3.15 | 2.75 | 2.25 |
| Fertilizer | 10.95 | 10.95 | 10.95 |
| Lime | .16 | .16 | .16 |
| Seed | 2.12 | 2.12 | 2.12 |
| Spray | .25 | .25 | .25 |
| Total | 28.43 | 27.06 | 24.42 |

*Derived from unpublished data collected in northwestern Ohio in 1962 by R. H. Blosser, Ohio Agricultural Research and Development Center.

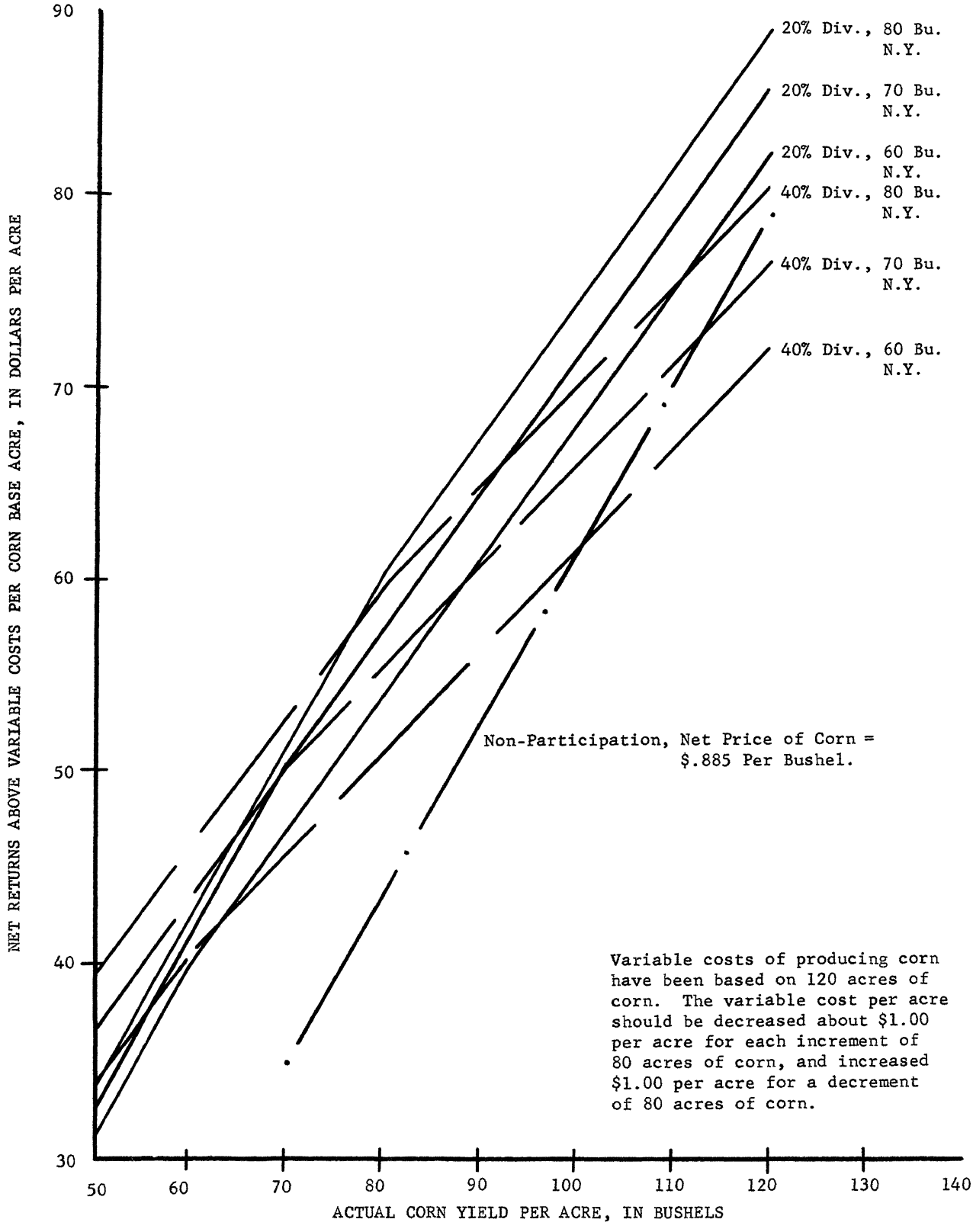


Fig. 2.–Net variable returns per corn base from feed grain program participation at 20 and 40 percent levels of diversion, at various normal and actual corn yields, with net market price of corn at $0.885 per bushel.

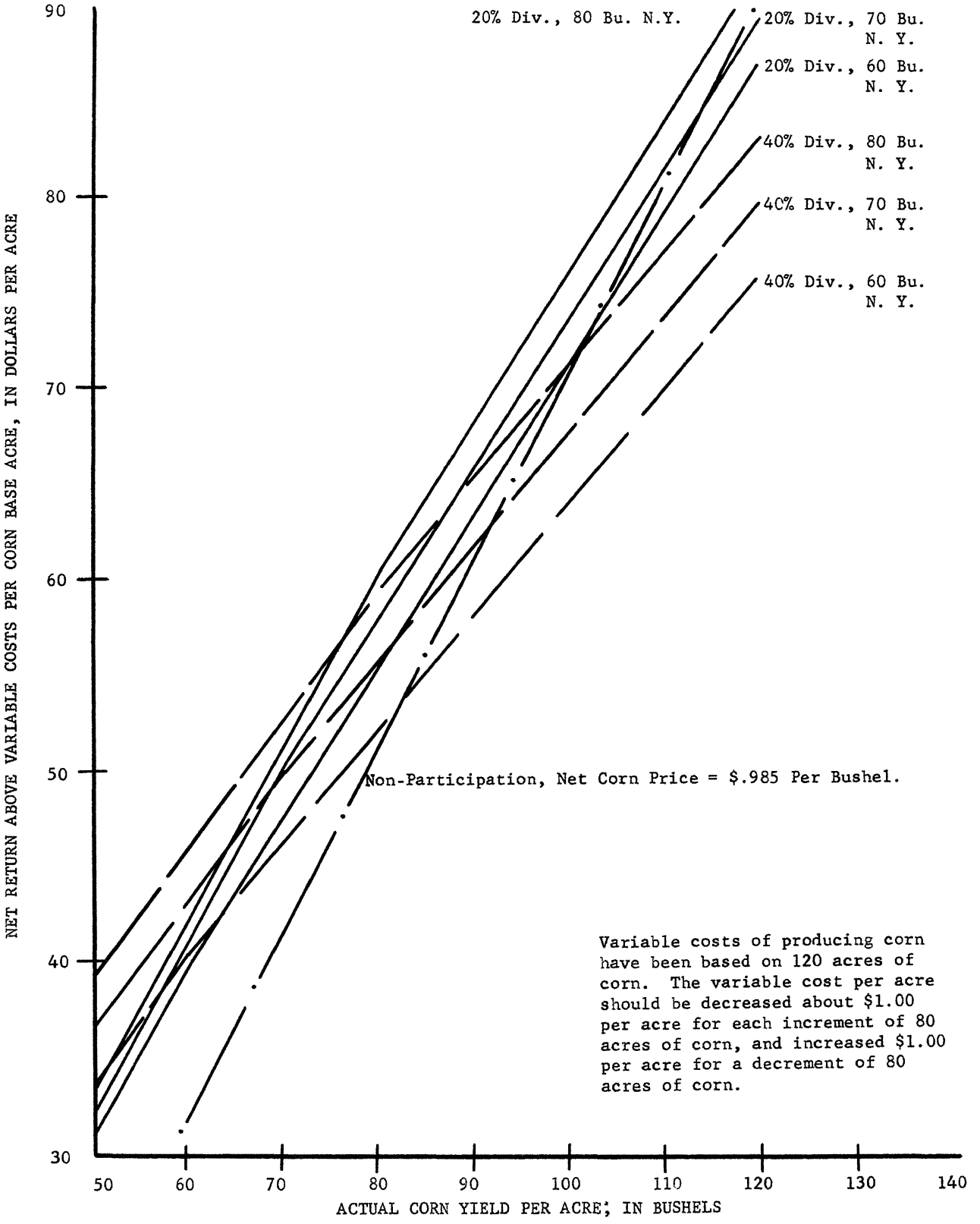


Fig. 3.—Net variable returns per corn base acre from feed grain program participation at 20 and 40 percent levels of diversion, at various normal and actual corn yields, with net market price of corn at $0.985 per bushel.

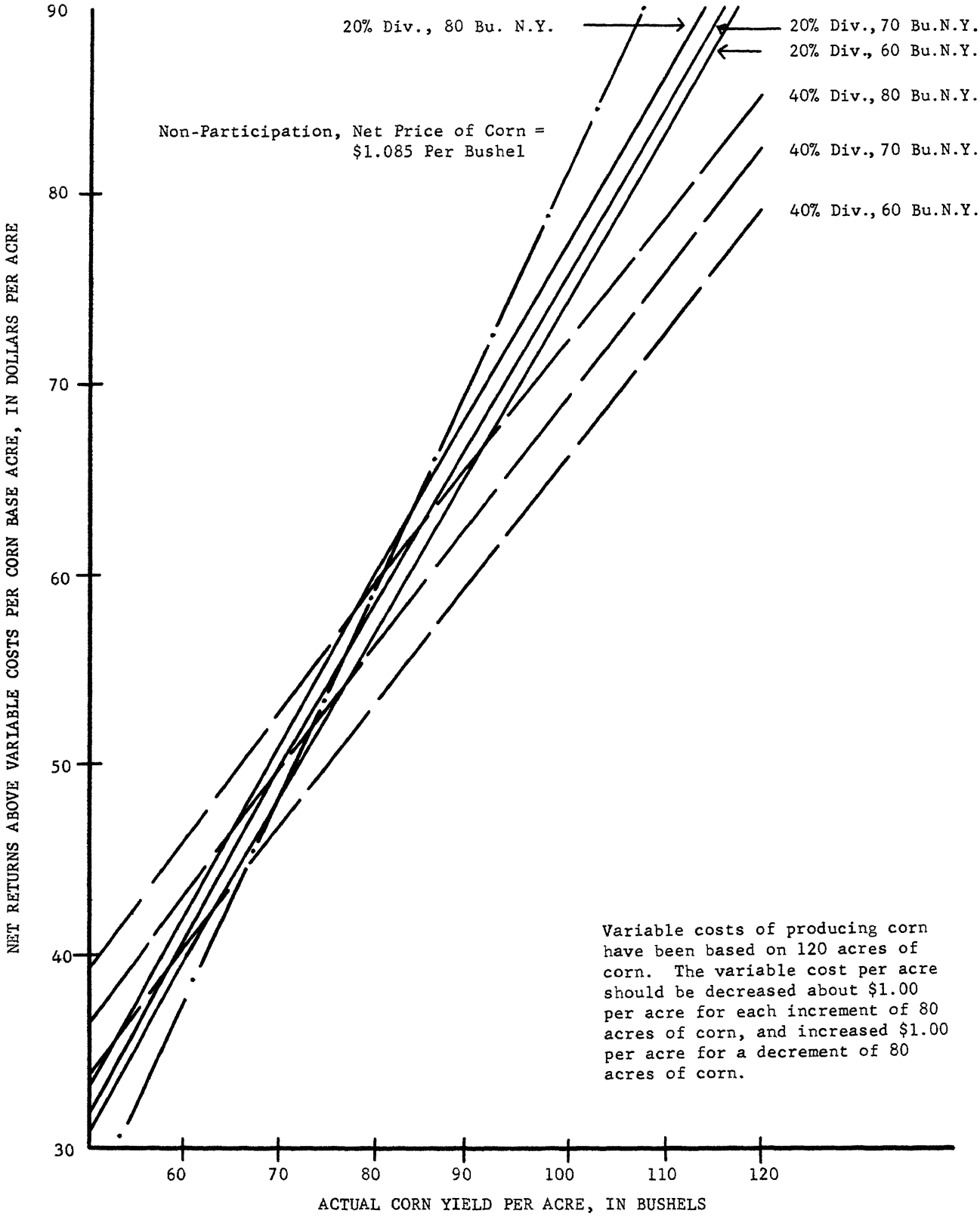


**Fig. 4.–Net variable returns per corn base acre from feed grain program participation at 20 and 40 percent levels of diversion, at various normal and actual corn yields, with net market price of corn at $1.085 per bushel.**

Assume the net market price of corn to be $0.885, which was true in 1962. On Figure 2, plot the intercept of a line from the base at actual corn yield of 95 bushels and the 40 percent diversion–70 bushels normal yield line. This intercept occurs above the line showing returns from nonparticipation. Proceeding left from the intercept to the left axis, it can be seen that farmer A would realize about $63.25 net variable returns per corn base acre by participating in the program at 40 percent diversion and about $57.00 per acre by staying out of the program. At 20 percent diversion, he would have $68.00 returns.

If the net market price of corn were $0.985 per bushel, farmer A, with the same set of yields, would be better off to stay out of the program at 40 percent diversion but should participate at 20 percent (Figure 3).

In Figure 4, with the net market price of corn at $1.085 per bushel, farmer A would receive less net return per corn base acre by participating at either the 20 percent or 40 percent levels than if he remained outside the feed grain program. At 40 percent diversion, his net return per base acre would be about $64.00, at 20 percent it would be about $72.00, and at no participation his return would be about $75.75. All of the above computations assume the normal variable production cost shown in Table 7

In Table 8, a summary is presented of the number of participants and nonparticipants who would have optimized returns per acre by participating at 20 and 40 percent diversion levels at the three given net market prices per bushel. The normal and actual yields for each group of farms were considered in the summarization.

Table 8 shows that at 1962 support and market prices, 45 of the 51 participants would have been better off to divert 20 percent and 41 of the group would have profited by diverting 40 percent. All but 5 of the 86 nonparticipants would have gained by being in the program at 20 percent and 69 would have made more per corn base acre by 40 percent diversion than by staying out of the program. These computations ignore the differences in selling and buying prices for farmers needing corn for livestock feeding. Livestock intensity per acre was greater on the nonparticipating farms.

As the market price approaches support price, the number of farmers profiting by nonparticipation increases. At a net market price of $1.085 per bushel (5¢/bu. differential) only 29 and 18 farmers out of 137 would have gained by program participation at the 20 percent and 40 percent diversion levels, respectively.

## FARMERS' REACTIONS TO VARIOUS PROGRAM MODIFICATIONS

During the interviews, farmers were asked questions designed to measure their response to possible changes in the 1962 program. The suggested changes included: (1) permitting participants to graze diverted acreage, (2) allowing a 5-year sign-up term, (3) reducing the diverted acreage payments if grazing were allowed, (4) retaining a 1-year program but adding an 18-cent per bushel payment for harvested corn in 1963.

Pasturing of diverted acres would have induced at least 13 more farmers[12] into the program in 1962

[12] Misinterpretation of the question affected these results. It is known that 13 nonparticipants would have participated if the grazing alternative had been available in 1962. Unfortunately, it is not known how many more misinterpreted the question and would have participated. Even the increase of 13 was statistically significant at the 0.08 probability level. Since the 13 represents a minimum increase in participation, it can be assumed that the results would have been significant at the 0.05 or 0.01 level if the entire sample of nonparticipants had been properly questioned.

**TABLE 8.–Numbers of Sample Farmers Who Would Optimize Returns per Corn Base Acre at 20 and 40 Percent Diversion Levels at Various Net Market Prices of Corn.**

| Type of Farm | Total No. of Farms | Number of Sample Operators Profiting by Participation at: Net Market Price of $0.885 at Diversion Level of 20% | 40% | Net Market Price of $0.985 at Diversion Level of 20% | 40% | Net Market Price of $1.085 at Diversion Level of 20% | 40% |
|---|---|---|---|---|---|---|---|
| Participant | 51* | 45 | 41 | 42 | 22 | 8 | 5 |
| Nonparticipant | 86 | 81 | 69 | 70 | 38 | 21 | 13 |

*18 of the 69 participating farmers diverted their entire corn base acreage. With no corn production and thus no actual yield, these 18 farms cannot be included in this analysis.

(Table 9). This increase over 1962 participation was significant at the 0.08 probability level. If the proposed reduction of payments were offered with the privilege of grazing the diverted acreage, a highly significant decrease in participation would have resulted. Most farmers were not willing to take a 25 percent cut in the payment for the privilege of pasturing.

A 5-year program with the option to graze would result in a statistically significant decrease in participation (Table 9) However, offering an optional 1- or 5-year program with grazing privileges would have increased participation in the 1962 program from 69 to 83 participators.

### Farmers' Plans for 1963

If changes had not been made in the feed grain program from 1962 to 1963, participation would have dropped substantially in 1963, as shown in Table 10. The decrease represents a 33 percent reduction in participation from 1962 to 1963 with the same program. This decrease is statistically significant at the 0.05 level.

The major modification suggested for the 1963 program would allow participants to receive a direct payment of 18 cents a bushel on corn for the normal yield of the acres planted for harvest. This 18 cents a bushel incentive would only raise participation from 46 to 49. Changing the 1962 program to a 5-year program with no other changes would have resulted in a highly significant drop in 1963 participation by those interested in a 1-year program. Thirty-five operators who would sign for a 1-year program would not agree to a 5-year program.

Operators who were interested in participating in 1963 indicated that they would also decrease their level of diversion. Table 10 shows the planned diversion reported by those operators who indicated that they would participate in 1963. Substantial increase in participation was indicated at the 20 percent level but this was more than offset by the decreased participation at levels above 20 percent.

### Evaluation of Modifications

Assuming a goal of maximum participation, the optional 1- or 5-year term with pasturing of diverted acreage and with 18 cents per bushel payments added to the 1962 program would have produced the greatest number of participants in 1963. Adding the grazing privileges and the variable signup term would be almost as effective. Little reduction in participation would occur if the 5-year option were deleted. Permitting only a 5-year option or decreasing the payment rate on diverted acreage would significantly decrease participation in 1963.

Thirty-three farmers in the sample participated in the feed grain program during each of the first 3 years of its existence. This represents 20 percent of the sample. On this basis, it appears that a minimum of approximately 20 percent of the farmers can be expected to participate in the feed grain program as long as there are no drastic changes in the program and the farming situation remains relatively stable.

### Reasons for Nonparticipation

Forty-seven percent of the nonparticipants reported that they would not be attracted into the program with any of the alternatives suggested in this study. Twenty-three percent felt the program was not sufficiently profitable, 7 percent objected to the program

**TABLE 9.—Effects of Suggested Program Changes on 1962 Participation.***

| Item | Would Participate | Would Not Participate |
|---|---|---|
| | No. of Farms | No. of Farms |
| Actual 1962 participation | 69 | 94 |
| 1962 program with pasturing privilege† | | |
| Same payment per acre | 82 | 81 |
| Decrease payment 25 percent | 11 | 152 |
| Decrease payment 50 percent | 2 | 161 |
| Change program to a 5-year term with pasturing privileges | | |
| Same payment per acre | 20 | 143 |
| Decrease payment 25 percent | 7 | 156 |
| Decrease payment 50 percent | 1 | 162 |
| Permit sign-up for a 1- or 5-year term, allow pasturing privileges, and maintain present payments per acre | 83 | 80 |

*All sample operators were asked whether or not they would participate if the program were changed by adding or decreasing each of the alternatives listed.

†See footnote[12], page 13.

**TABLE 10.–Participation in 1962 and 1963 with the Same Program and with a Program Paying an Additional 18 Cents a Bushel Direct Payment.**

| Item | Planned Diversion Level | | | | |
|---|---|---|---|---|---|
| | 20 Percent | 20-40 Percent | 40 Percent | Don't Know | Total |
| 1962 participation | 3 | 14 | 52 | 0 | 69 |
| 1963 participation with no program changes | 19 | 1 | 18 | 8* | 46 |
| Total participation in 1963 with 18¢/bu. payment | 20 | 1 | 20 | 8* | 49 |

*Eight operators would participate in 1963 but were undecided at what level.

per se, and 2 percent felt they lacked adequate information. Fifteen percent offered a variety of reasons for nonparticipation, including low corn base, need for feed, plans to sell their farms, preference for independence, and objections to red tape.

### Adjustments Farmers Would Make If Pasturing Were Permitted

Twenty-two percent of the farmers interviewed indicated an interest in pasturing diverted corn ground but only four farmers said they would purchase additional livestock if allowed the grazing privilege. Sixty percent of the operators stated that lack of fencing precluded additional livestock and 58 percent listed inadequate buildings or equipment as the reason for not increasing livestock numbers. More than one-fourth of the respondents reported insufficient water for more livestock and half gave a lack of winter feed as a deterrent to livestock expansion. It would appear that the grazing option would be popular but would not promote an appreciable increase in livestock on the participating farms.

## SUMMARY AND CONCLUSIONS

A study of 163 farms in western Ohio revealed that the farms of participants in the 1962 Feed Grain Program were larger, had more cropland, and had a larger corn base than farms of nonparticipants. The average size of participating farms was 159 acres compared to 134 acres on nonparticipating farms. Differences found in the use of cropland in 1962 included more soybeans and wheat on the participants' farms and more oats, hay, and rotation pasture on farms not in the program.

The assigned normal corn yields for participants and nonparticipants were 65 and 62 bushels, respectively. In 1962, the increase over 1961 in the amount of plant nutrients per corn acre, applied as fertilizer, was about 12 percent for participants and 8 percent for nonparticipants. Actual corn yields in 1962 were 90 bushels and 86 bushels, respectively. For both groups, actual yields were 38 percent higher than normal yields. Thus, assuming yields indicate land quality, there was a nonsignificant difference in the land quality of the participant and the nonparticipant farms.

Livestock farmers were less likely to participate in feed grain program than cash grain farmers. A group of four livestock counties had an average participation rate of 32 percent while a group of three cash grain counties had an average participation rate of 40 percent. Dairy farmers in particular were reluctant to divert corn acreage. In many cases, participants did not reduce their livestock numbers even if feed grain purchases were necessary. Participants averaged 19.7 animal units per farm compared with 23.9 for nonparticipants.

Twenty-five of the 69 participants (36 percent) and 29 of 94 nonparticipants (31 percent) worked off the farm 100 days or more during the year. Twelve of the 69 operators diverted their entire base acreage, thus eliminating labor requirements for the corn enterprise except for maintenance on the diverted cropland.

The nonparticipant group contained a greater percentage of full-time farmers. It appears that labor scarcity was an important factor in the decision to participate. The program afforded risk reduction for participants in terms of an insured income from diverted acres and also a potential means of releasing labor resources for noncrop enterprises or for off-farm employment.

From these findings it is concluded that the feed grain program has the greatest impact in Ohio communities with a high proportion of crop farms and with opportunity for nonfarm employment. The program has less impact in livestock areas.

No significant difference existed between the mean age of the two groups. However, there was a significantly larger number of participants of 60 years of age or older. It is concluded, therefore, that the feed grain program in Ohio had special appeal to older operators.

There was no significant difference between the proportion of owners, part-owners, or tenants who participated and those who did not

Most farmers diverted at the higher levels of diversion, although the 20 percent diversion level was usually more profitable The increase in payment rate per acre between the 20 percent and 40 percent levels of diversion did not offset the income sacrificed by selling fewer bushels of corn at the price support However, the difference in income between the minimum and maximum levels of diversion was not great enough in many cases to offset the value of the reduction in labor requirements because of diversion at a higher level

The study indicates that 81 nonparticipants would have made more profit from corn production in 1962 if they had been in the program and diverted 20 percent of their corn base and 69 would have profited by diverting 40 percent of their corn base A similar analysis of participants showed that only 12 percent of the operators would have profited by remaining out of the program

Farmers not participating gave the following reasons, in order of frequency·

1 They felt the program wasn't profitable for them
2 They objected to production controls
3 They lacked a full understanding of the program
4 They felt their assigned corn bases were too low
5 They needed the feed
6 They preferred independence from government control

Inclusion of permission to graze diverted acreage was the only suggested modification which would attract a significant increase in program participation When grazing privileges were to be accompanied by decreased payment for diverted land, however, participation willingness dropped off sharply Very few farmers reported interest in a 5-year signup term or in a proposed 18¢ per bushel direct payment plan

The percentage of total base acreage diverted in Ohio was the same as for the United States and about 1 percentage point less than the average of the North Central Region It was higher than in Indiana, Illinois, Iowa, Minnesota, and Wisconsin but lower than in Michigan and Missouri Michigan and Ohio are more highly industrialized than the other states mentioned Thus, the factor of alternative uses of labor may have affected participation

# The State Is the Campus for Agricultural Research and Development


Ohio's major soil types and climatic conditions are represented at the Research Center's 11 locations. Thus, Center scientists can make field tests under conditions similar to those encountered by Ohio farmers.

Research is conducted by 14 departments on more than 5900 acres at Center headquarters in Wooster, nine branches, and The Ohio State University.

Center Headquarters, Wooster, Wayne County: 2017 acres

Eastern Ohio Resource Development Center, Caldwell, Noble County: 2039 acres

Mahoning County Experiment Farm, Canfield: 275 acres

Muck Crops Branch, Willard, Huron County: 15 acres

North Central Branch, Vickery, Erie County: 335 acres

Northwestern Branch, Hoytville, Wood County: 247 acres

Southeastern Branch, Carpenter, Meigs County· 330 acres

Southern Branch, Ripley, Brown County· 275 acres

Vegetable Crops Branch, Marietta, Washington County: 20 acres

Western Branch, South Charleston, Clark County: 428 acres